



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,499	03/08/2004	Thomas L. Rodeheffer	200314517-1	3980
22879	7590	03/23/2006	EXAMINER	
HEWLETT PACKARD COMPANY P O BOX 272400, 3404 E. HARMONY ROAD INTELLECTUAL PROPERTY ADMINISTRATION FORT COLLINS, CO 80527-2400			WEST, JEFFREY R	
			ART UNIT	PAPER NUMBER
			2857	

DATE MAILED: 03/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

HJD

Office Action Summary	Application No.	Applicant(s)	
	10/797,499	RODEHEFFER, THOMAS L.	
	Examiner	Art Unit	
	Jeffrey R. West	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>03/08/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because its length exceeds the 150-word limit.

Correction is required. See MPEP § 608.01(b).

Claim Objections

2. Claims 1, 11, 14, and 22 are objected to because of the following informalities:

In claim 1, line 11, to avoid problems of antecedent basis, "the likelihood" should be ---a likelihood---.

In claim 1, line 13, to avoid problems of antecedent basis, "the likelihood" should be ---a likelihood---.

In claim 11, line 8, to avoid problems of antecedent basis, "the likelihood" should be ---a likelihood---.

In claim 11, line 15, to avoid problems of antecedent basis, "the likelihood" should be ---a likelihood---.

In claim 14, line 4, "module stored" should be ---module, stored---.

In claim 14, line 6, to avoid problems of antecedent basis, "the likelihood" should be ---a likelihood---.

In claim 14, line 11, "module stored on the tangible medium the" should be ---module, stored on the tangible medium, the---.

In claim 14, line 14, "module stored on the tangible medium the" should be --- module, stored on the tangible medium, the---.

In claim 14, line 18, to avoid problems of antecedent basis, "the likelihood" should be ---a likelihood---.

In claim 22, lines 4-5, to avoid problems of antecedent basis, "the likelihood" should be ---a likelihood---.

In claim 22, lines 14-15, to avoid problems of antecedent basis, "the likelihood" should be ---a likelihood---.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is considered to be vague and indefinite because lines 17-19 recite, "determining a probabilistic estimate that each of the resources in the group of the plurality of resources is good based on the performance of the test on the group of the plurality of resources". This limitation is considered to be vague and indefinite because it refers to an estimate and performance of "the group" while the claim earlier presents "iteratively performing the test on various groups". Therefore, it is

unclear to one having ordinary skill in the art as to which of the various groups “the group” refers.

Claims 11, 14, and 22 are similarly rejected for their similar recitations regarding “the group” on in line 15 of claim 11, lines 17 and 18 of claim 14, and lines 13 and 15 of claim 22.

Claim 14 is further considered to be vague and indefinite because it specifies a “computer program...comprising a tangible medium” and it is unclear to one having ordinary skill in the art how a program itself can comprise a medium as opposed to a medium comprising a program.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps because the claim presents “A method of probabilistic defect isolation in a system” without any step related to and/or for performing defect isolation. See MPEP § 2172.01.

Claims 14 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements because the claims present “A computer program for probabilistic defect isolation in a system” and “A computer system for probabilistic defect isolation”, respectively, without any module related to and/or for performing defect isolation. See MPEP § 2172.01.

Claims 2-10, 12, 13, 15-21, and 23-27 rejected under 35 U.S.C. 112, second paragraph, because they incorporate the lack of clarity present in their respective parent claims.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 14-21 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 14-21 present a computer program comprising a plurality of modules. These modules are considered to be data structures that do not define any functional interrelationships between the data structures and other claimed aspects of the invention which permit the data structure's functionality to be realized. It has been held that such a data structure is considered to be non-statutory under 35 U.S.C. 101 (See e.g., *Warmerdam* 33 F.3d at 1361. 31 USPQ2d at 1760).

Further, apart from the utility requirement of 35 U.S.C. 101, usefulness under the patent eligibility standard requires significant functionality to be present to satisfy the useful result aspect of the practical application requirement (See *Arrhythmia*, 958 F.2d at 1057, 22 USPQ2d at 1036). Merely claiming nonfunctional descriptive material stored in a computer-readable medium does not make the invention eligible for patenting. For example, a claim directed to a word processing file stored on a disk may satisfy the utility requirement of 35 U.S.C. 101 since the information stored

may have some "real world" value. However, the mere fact that the claim may satisfy the utility requirement of 35 U.S.C. 101 does not mean that a useful result is achieved under the practical application requirement. The claimed invention as a whole must produce a "useful, concrete and tangible" result to have a practical application. In the instant case, the limitations of claims 14-21 only provide code modules that do not provide any "useful, concrete, and tangible" result.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 11, 13-19, and 21-25 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,327,437 to Balzer.

With respect to claim 11, Balzer discloses a system comprising a set that comprises a plurality of resources (column 1, lines 15-17), each of the plurality of resources having at least one characteristic (i.e. electrical parameters) (column 1, lines 17-20), each of the plurality of resources being defined to be good if the characteristic of that resource meets a predetermined criterion and being otherwise defined to be bad (column 1, lines 28-40 and column 8, lines 16-21), means for assigning to each resource in a group of the plurality of resources an initial probabilistic estimate of the likelihood that each of the resources in the group of the

plurality of resources is good (column 16, lines 23-25), means for assigning a probabilistic estimate of the likelihood that the group of the plurality of resources might accidentally pass the test (column 17, lines 31-41 and column 18, lines 18-53 and 61-68), means for iteratively performing a test on various groups of the plurality of resources (column 7, lines 40-42 and column 19, lines 33-37), and means for determining a probabilistic estimate that each of the resources in the groups of the plurality of resources is good based on the performance of the test on the groups of the plurality of resources and based on a probabilistic estimate of the likelihood that the group of the plurality of resources might accidentally pass the test (i.e. return to testing procedure and repeat testing and probabilistic estimate determination of the likelihood that the resource is good) (column 15, lines 60-64 and column 16, lines 12-26).

With respect to claim 13, Balzer discloses means for determining the probabilistic estimate of the likelihood that the group of the plurality of resources might accidentally pass the test (column 17, lines 31-41 and column 18, lines 18-53 and 61-68).

With respect to claims 14 and 22, Balzer discloses a computer program for probabilistic defect isolation in a system comprising a tangible medium embodied on a computer as part of a system (column 7, lines 29-42),

With respect to claims 15 and 23, Balzer discloses a counting module stored on the tangible medium and adapted to count a number of iterative tests (i.e. sum of

number of good and number of bad) and a number of particular test outcomes (i.e. number of good) (column 18, lines 60-68).

With respect to claim 16 and 24, Balzer discloses a probability determining module stored on the tangible medium adapted for determining the probabilistic estimate that each of the resources in the group of the plurality of resources is good by determining a ratio of the number of iterative tests and the number of particular test outcomes (column 18, lines 60-68).

With respect to claim 17, Balzer discloses a counting module stored on the tangible medium adapted for counting a number of iterative tests and a number of particular test outcomes as summations of probabilities (i.e. a running sum of probabilities) (column 18, lines 60-68 and column 19, lines 4-8).

With respect to claim 18, Balzer discloses a counting module stored on the tangible medium and adapted for counting a number of iterative tests by increasing the number of iterative tests for each iterative test by a value based on the probabilistic estimate of the likelihood that the group of the plurality of resources might accidentally pass the test (column 18, lines 60-68 and column 19, lines 15-20).

With respect to claim 19, Balzer discloses a counting module stored on the tangible medium adapted for counting a number of particular test outcomes by increasing the number of particular test outcomes for each particular outcome by a value based on the probabilistic estimate of the likelihood that the group of the plurality of resources might accidentally pass the test (column 19, lines 15-20).

With respect to claim 21, Balzer discloses a second estimate module stored on the tangible medium being adapted to determine the probabilistic estimate of the likelihood that the group of the plurality of resources might accidentally pass the test (i.e. return to testing procedure and repeat testing and probabilistic estimate determination of the likelihood that the resource is good based on new limits corrected for the probability that a resource might accidentally pass the test) (column 15, lines 60-64, column 16, lines 12-26 and column 19, lines 25-32).

With respect to claim 25, Balzer discloses a counting module adapted for counting a number of particular test outcomes by increasing the number of particular test outcomes for each particular outcome by a value of a probabilistic estimate of the likelihood that the group of the plurality of resources correctly passes the test (column 19, lines 14-21) which is identical to increasing the number of particular test outcomes by a value of one minus a probabilistic estimate of the likelihood that the group of the plurality of resources accidentally/incorrectly passes (see for example, Balzer's teaching that a pass error rate is equal to one minus an pass accuracy (column 19, line 25) as well as the knowledge of one having ordinary skill in the art (U.S. Patent No. 6,707,936 to Winter et al., U.S. Patent Application Publication No. 2003/0172074 to Highleyman et al. and U.S. Patent Application Publication No. 2003/0126103 to Chen et al.)

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-8, 10, 12, 20, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balzer in view of U.S. Patent No. 6,055,463 to Cheong et al.

With respect to claim 1, Balzer discloses a method of probabilistic defect isolation in a system, comprising identifying a plurality of resources (i.e. electronic assemblies) (column 1, lines 15-17), each resource in the plurality of resources having at least one characteristic (i.e. electrical parameters) (column 1, lines 17-20), each resource in the plurality of resources being defined to be good if the characteristic of that resource meets a predetermined criterion and being otherwise defined to be bad (column 1, lines 28-40 and column 8, lines 16-21), defining a test to apply to a group of the plurality of resources (column 10, lines 1-5), assigning to each resource in the group of the plurality of resources an initial probabilistic estimate of the likelihood that that resource is good (column 16, lines 23-25), assigning a probabilistic estimate of the likelihood that the group of the plurality of resources might accidentally pass the test (column 17, lines 31-41 and column 18, lines 18-53 and 61-68), iteratively performing the test on various groups of the plurality of resources (column 7, lines 40-42 and column 19, lines 33-37), and determining a probabilistic estimate that each of the resources in the group of the plurality of resources is good based on the performance of the test on the group of the plurality of resources (i.e. return to testing procedure and repeat testing and

probabilistic estimate determination of the likelihood that the resource is good) (column 15, lines 60-64 and column 16, lines 12-26).

With respect to claims 2 and 3, Balzer discloses counting a number of iterative tests (i.e. sum of number of good and number of bad) and a number of particular/successful test outcomes (i.e. number of good) (column 18, lines 60-68).

With respect to claim 4, Balzer discloses determining the probabilistic estimate that each of the resources in the group of the plurality of resources is good by determining a ratio of the number of iterative tests and the number of particular test outcomes (column 18, lines 60-68).

With respect to claim 5, Balzer discloses counting the number of iterative tests and the number of particular test outcomes as summations of probabilities (i.e. a running sum of probabilities) (column 18, lines 60-68 and column 19, lines 4-8).

With respect to claim 6, Balzer discloses counting a number of iterative tests by increasing the number of iterative tests for each iterative test by a value based on the probabilistic estimate of the likelihood that the group of the plurality of resources might accidentally pass the test (column 18, lines 60-68 and column 19, lines 15-20).

With respect to claim 7, Balzer discloses counting a number of particular test outcomes by increasing the number of particular test outcomes for each particular outcome by a value based on the probabilistic estimate of the likelihood that the group of the plurality of resources might accidentally pass the test (column 19, lines 15-20).

With respect to claim 10, Balzer discloses determining the probabilistic estimate that each of the resources in the group of the plurality of resources is good based on the probabilistic estimate of the likelihood that the group of the plurality of resources might accidentally pass the test (i.e. return to testing procedure and repeat testing and probabilistic estimate determination of the likelihood that the resource is good based on new limits corrected for the probability that a resource might accidentally pass the test) (column 15, lines 60-64, column 16, lines 12-26 and column 19, lines 25-32).

As noted above, the invention of Balzer teaches many of the features of the claimed invention and while the invention of Balzer does teach performing a test on multiple DUTs/resources (column 7, lines 18-20 and 40-42, column 9, lines 47-49 and column 10, lines 1-5), Balzer does not specify that the test is only designated as a pass when all of the resources pass the test with the resources selected such that a probability value of an outcome equals a value.

Cheong teaches a control system and method for semiconductor integrated circuit test processes comprising a plurality of resources undergoing testing (column 4, lines 21-31) and selecting a plurality of the resources to be binned (column 4, lines 42-50) such that a probabilistic value of an outcome of the performance of the test approximately equals a value for each bin (column 4, lines 61-63 and column 5, lines 45-63), wherein the decision for one of the bins is designated as a pass when all of the resources pass the test (column 2, lines 45-54 and column 8, lines 5-8).

It would have been obvious to one having ordinary skill in the art to modify the invention of Balzer to specify that the test is only designated as a pass when all of the resources pass the test with the resources selected such that a probability value of an outcome equals a value, as taught by Cheong, because Balzer does teach performing a test on multiple resources and Cheong suggests that the combination would have improved the method of Balzer by providing the user with the ability select resources with a probability of producing a predetermined value to allow the user to determine when the resources meet a high enough test passing rate to warrant mass production (column 7, lines 46-51 and column 8, lines 24-35) with a test passing rate controllable to 100% as determined by the user based on the type of device being tested (column 2, lines 45-54 and column 8, lines 5-8).

11. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Balzer in view of Cheong and further in view of U.S. Patent No. 5,659,555 to Lee et al.

As noted above, the invention of Balzer and Cheong teaches many of the features of the claimed invention and while the invention of Balzer and Cheong does teach performing a test on multiple DUTs/resources, the combination does not specify that the resources be selected for testing using a graph walking system.

Lee teaches a method and apparatus for testing protocol including a plurality of device states to be tested (column 5, lines 61-65) with the plurality of states represented as a graph (column 6, lines 26-31) and performing a graph walking to select the states to be tested (column 7, lines 3-16).

It would have been obvious to one having ordinary skill in the art to modify the invention of Balzer and Cheong to specify that the resources be selected using a graph walking system, as taught by Lee, because the invention of Balzer and Cheong does teach performing a test on multiple resources and, as suggested by Lee, the combination would have improved the efficiency of testing multiple devices by providing means for insuring that each resource of the group of resources is tested, but not repeatedly tested (column 7, lines 3-16 and column 8, lines 31-36).

12. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Balzer in view of U.S. Patent No. 5,659,555 to Lee et al.

As noted above, the invention of Balzer teaches many of the features of the claimed invention and while the invention of Balzer does teach performing a test on multiple DUTs/resources, Balzer does not specify that the resources be selected for testing using a graph walking system.

Lee teaches a method and apparatus for testing protocol including a plurality of device states to be tested (column 5, lines 61-65) with the plurality of states represented as a graph (column 6, lines 26-31) and performing a graph walking to select the states to be tested (column 7, lines 3-16).

It would have been obvious to one having ordinary skill in the art to modify the invention of Balzer to specify that the resources be selected using a graph walking system, as taught by Lee, because Balzer does teach performing a test on multiple resources and, as suggested by Lee, the combination would have improved the

efficiency of testing multiple devices by providing means for insuring that each resource of the group of resources is tested, but not repeatedly tested (column 7, lines 3-16 and column 8, lines 31-36).

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

U.S. Patent No. 5,822,218 to Moosa et al. teaches systems, methods, and computer program products for prediction of defect-related failures in integrated circuits.

U.S. Patent No. 6,691,249 to Barford et al. teaches probabilistic diagnosis, in particular for embedded and remote applications.

U.S. Patent No. 6,072,574 to Zeimantz teaches an integrated circuit defect review and classification process.

U.S. Patent No. 5,815,654 to Bieda teaches a method for determining software reliability.

U.S. Patent No. 6,707,936 to Winter et al. teaches a method and apparatus for predicting device yield from a semiconductor wafer including a teaching that a success probability is calculated by taking one minus a failure probability.

U.S. Patent Application Publication No. 2003/0172074 to Highleyman et al. teaches a method of increasing system availability by splitting a system including a

teaching that a probability that a system is down is equal to the probability of one minus the probability that a system is operational.


U.S. Patent Application Publication No. 2003/0126103 to Chen et al. teaches an agent using detail predictive model including a teaching that the probability of an order being cancelled is equal to one minus the probability of an order being created.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is (571)272-2226. The examiner can normally be reached on Monday through Friday, 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (571)272-2216. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2857

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jeffrey R. West
Examiner – AU 2857

March 20, 2006